

However, it will be recognized by one skilled in the art that the present invention may be practiced without these specific details or with equivalents thereof. In other instances, well-known methods, procedures, components, and circuits have not been described in detail as not to unnecessarily obscure aspects of the present invention.

[0021] Some portions of the detailed descriptions, which follow, are presented in terms of procedures, steps, logic blocks, processing, and other symbolic representations of operations on data bits that can be performed on computer memory. These descriptions and representations are the means used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art. A procedure, computer executed step, logic block, process, etc., is here, and generally, conceived to be a self-consistent sequence of steps or instructions leading to a desired result. The steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated in a computer system. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like.

[0022] It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise as apparent from the following discussions, it is appreciated that throughout the present invention, discussions utilizing terms such as “detecting,” “determining,” “displaying,” or “utilizing,” “identifying,” “initiating” or the like, refer to the actions and processes of a computer system, or a similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system’s registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices.

[0023] In one embodiment, FIG. 1 depicts an apparatus 10 for improving display functionality in accordance with an embodiment of the present invention.

[0024] In one embodiment of the present invention, a portable display 12 is selected from the group consisting of a Personal Digital Assistant (PDA) display; a laptop display; a digital watch display; a cell phone display; a blackberry-type data device display; a digital camera display; and a digital camcorder display. According to Dictionary.com, a Personal Digital Assistant (PDA) is a small hand-held computer typically providing calendar, contacts, and note-taking applications but may include other applications, for example a web browser and a media player. Small keyboards and pen-based input systems are most commonly used for user input.

[0025] In an embodiment of the present invention, in order to access a physical area outside a portable display 12, a user moves the portable display 12 in a physical area. The physical area can comprise a line (1D physical area), a plane (2D physical area), or a 3D physical area.

EXAMPLE I

[0026] As an example, a PDA with improved display functionality (according to an embodiment of the present invention) is placed on a financial page of Wall Street Journal. The PDA can read the financial data published on this page when

a user moves the device around the page. In other words, upon detecting the movement of the PDA in a given direction, a portion of the financial page in that direction, which was previously not viewable, is displayed on portable display 12. This results in a device having a virtual window that has a size much larger than the physical size of the portable display 12 itself.

[0027] Referring still to FIG. 1, in one embodiment of the present invention, the apparatus 10 further comprises a radio-based position determination device 31 further comprising a radio-based transceiver 32 and an antenna 33.

[0028] In one embodiment of the present invention, the radio-based position transceiver 32 is selected from the group consisting of: an autonomous satellite receiver; a Virtual Reference Station (VRS)-based differential satellite positioning system receiver; a Wide Area Augmentation Service (WAAS)-based differential satellite positioning system receiver; a Real Time Kinematic (RTK)-based satellite positioning system receiver; an Omni STAR-High Performance (HP)-based differential satellite positioning system receiver; and a pseudolite receiver.

[0029] In embodiments of the present invention, radio-based position transceiver 32 comprises a Global Navigation Satellite System (GNSS) transceiver. In embodiments of the present invention, the satellite receiver is selected from the group consisting of: a Global Positioning System (GPS) receiver; a GLONASS receiver, a Global Navigation Satellite System (GNSS) receiver; and a combined GPS-GLONASS receiver.

[0030] The Global Positioning System (GPS) is a system of satellite signal transmitters that transmits information from which an observer’s present location and/or the time of observation can be determined. The GPS was developed by the United States Department of Defense (DOD) under its NAVSTAR satellite program and is discussed in greater detail in document ICD-GPS-200: GPS Interface Control Document, ARINC Research, 1997, GPS Joint Program Office, which is incorporated by reference herein.

[0031] The second satellite-based navigation system is the Global Orbiting Navigation Satellite System (GLONASS), placed in orbit by the former Soviet Union and is now maintained by the Russian Republic.

[0032] As disclosed in the European Commission “White Paper on European transport policy for 2010”, the European Union is developing an independent satellite navigation system GALILEO as a part of a global navigation satellite infrastructure (GNSS). The specifications for the GALILEO system are well known and embodiments of the present invention are well suited to utilize GALILEO positioning information to determine a geographic position of apparatus 10.

[0033] Reference to a radio positioning system (RADPS) herein refers to a Global Positioning System (GPS), to a Global Orbiting Navigation System (GLONASS), to GALILEO System, and to any other compatible Global Navigational Satellite System (GNSS) satellite-based system that provides information by which an observer’s position and the time of observation can be determined, all of which meet the requirements of the present invention, and to a ground based radio positioning system such as a system comprising of one or more pseudolite transmitters.

[0034] After the RADPS receiver determines the coordinates of i-th satellite by demodulating the transmitted ephemeris parameters, the RADPS receiver can obtain the solution of the set of the simultaneous equations for its unknown